

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A zoom optical system comprising a lens system which is arranged to provide a variable zoom setting for a beam of radiation, wherein the lens system comprises a switchable optical element having a first mode and a second mode, characterised in that wherein the switchable optical element includes a first fluid, a second fluid, a chamber fluidly connected via two openings of the chamber to a conduit, and a wavefront modifier having a part through which said radiation beam is arranged to pass, wherein in the first mode the switchable optical element has a first fluid configuration in which said part is substantially covered by the first fluid, and in the second mode the switchable optical element has a second, different, fluid

configuration in which said part is substantially covered by the second fluid, the first fluid substantially filling the chamber in the first mode and the second fluid substantially filling the chamber in the second mode.

2. (Currently Amended) A The zoom optical system according to claim 1, wherein the first fluid is a liquid and the second fluid is gaseous.

3. (Currently Amended) A The zoom optical system according to claim 1, wherein the switchable optical element comprises a common first fluid electrode, a second, different, fluid electrode and a third, different, fluid electrode, wherein in the first fluid configuration the switchable optical element is arranged to provide switchable electrowetting forces by applying a first voltage across said first and second fluid electrodes, and in the second fluid configuration the switchable optical element is arranged to provide different switchable electrowetting forces by applying a second, different, voltage across said first and third fluid electrodes.

4. (Currently Amended) A The zoom optical system according to claim 1, wherein the switchable optical element comprises a further wavefront modifier having a different part through which said radiation beam is arranged to pass, wherein the wavefront modifier is adapted to perform a first wavefront modification and the further wavefront modifier is adapted to perform a second, different, wavefront modification which is arranged to complement the first wavefront modification.

5. (Currently Amended) A The zoom optical system according to claim 1, wherein the wavefront modifier has a face, wherein said face is substantially spherical or aspherical, and said part is on said face.

6. (Currently Amended) A The zoom optical system according to claim 1, wherein said lens system comprises a further switchable optical element, said further switchable optical element being arranged to operate in cooperation with said switchable optical

element to provide at least part of said variable zoom setting of the lens system.

7. (Currently Amended) A The zoom optical system according to claim 1, wherein said first lens is a fluid meniscus lens which comprises different fluids separated by a fluid meniscus having a curvature, wherein the optical system further comprises a control system and the variable focus comprises variations in the fluid meniscus curvature, wherein the control system is arranged to control the variable focus using meniscus electrowetting forces.

8. (Currently Amended) A The zoom optical system according to claim 7, wherein the fluid meniscus lens further comprises a first electrode and a second, different, electrode and the control system is arranged to apply a voltage across said first and second meniscus electrodes to provide said meniscus electrowetting forces.

9. (Currently Amended) A The zoom optical system according to ~~claim 1~~ claim 1, wherein the lens system comprises a solid lens

capable of being arranged at varying spatial positions relative to the switchable optical element.

10. (Currently Amended) A-The zoom optical system according to claim 1, wherein said lens system comprises a liquid crystal lens having a varying optical power.

11. (Currently Amended) Image-An image capturing apparatus comprising a-the zoom optical system according to claim 1, wherein with the optical system being in said first mode, the apparatus is adapted to capture an image with a first zoom setting, and with the optical system being in said second mode, said apparatus is adapted to capture an image with a second, different, zoom setting.

12. (Currently Amended) Image-The image capturing apparatus according to claim 11, wherein said image capturing apparatus further comprises a digital zoom system arranged to introduce a digital zoom factor to an image captured in the first mode and/or an image captured in the second mode.

PATENT
Serial No. 10/596,761
Amendment in Reply to Office Action of January 9, 2008

13. (New) The zoom optical system of claim 1, wherein the second fluid substantially fills the conduit in the first mode and the first fluid substantially fills the conduit in the second mode.